WHAT IS CLAIMED IS:

1.   A projection optical system for performing reduction projection of a pattern of a reticle, comprising:

a first mirror having a concave surface shape;

a second mirror having a concave surface shape;

a third mirror having a convex surface shape;

a fourth mirror having a concave surface shape;

a fifth mirror having a convex surface shape; and

a sixth mirror having a concave surface shape,

wherein said first to sixth mirrors being disposed in the named order along an optical path from the reticle side, and wherein each of the six mirrors has a curvature radius having an absolute value not greater than 1500 mm.

2.   A projection optical system according to Claim 1, further comprising an aperture stop disposed adjacent said second mirror.

3.   A projection optical system according

to Claim 1, wherein, among the six mirrors, said second mirror has a curvature radius having a largest absolute value.

5   4.   A projection optical system according to Claim 1, wherein, among the six mirrors, said first mirror has a curvature radius having a largest absolute value.

10   5.   A projection optical system according to Claim 1, wherein, among the six mirrors, said second mirror is disposed closest to the reticle.

          6.   A projection optical system according to Claim 1, wherein, among the six mirrors, the or

15   each mirror having an effective diameter greater than 400 mm has a curvature radius having an absolute value not greater than 1000 mm.

20   7.   A projection optical system according to Claim 1, wherein each of the six mirrors has a reflection surface of aspherical shape.

          8.   A projection optical system according to Claim 1, wherein five mirrors of the six

25   mirrors have a curvature radius having an absolute value not greater than 1300 mm.

9. A projection optical system according to Claim 1, wherein five mirrors of the six mirrors have a curvature radius having an absolute value not greater than 1250 mm.

10. A projection optical system according to Claim 1, wherein four mirrors of the six mirrors have a curvature radius having an absolute value not greater than 700 mm.

11. A projection optical system according to Claim 1, wherein four mirrors of the six mirrors have a curvature radius having an absolute value not greater than 630 mm.

12. A projection optical system according to Claim 1, wherein said first mirror has a conic coefficient k1 that satisfies a relation $50 < k1 < 150$.

13. A projection optical system according to Claim 1, wherein said first mirror has a conic coefficient k1 that satisfies a relation $80 < k1 < 130$.

14. A projection optical system according to Claim 1, wherein said fifth mirror has a conic coefficient k5 that satisfies a relation $5 < k5 < 20$.

15. A projection optical system according to Claim 1, wherein said fifth mirror has a conic coefficient k5 that satisfies a relation 7.5<k5<12.

16. A projection optical system according to Claim 1, wherein said projection optical system performs reduction projection of the reticle pattern by use of extreme ultraviolet light.

17. A projection optical system according to Claim 1, wherein said projection optical system is constituted only by said first, second, third, fourth, fifth and sixth mirrors.

18. An exposure apparatus, comprising:
        a projection optical system as recited in Claim 1, for performing reduction projection of a pattern of a reticle; and
        an illumination optical system for illuminating the reticle with extreme ultraviolet light.

19. An apparatus according to Claim 18, wherein said projection optical system is constituted only by the first, second, third, fourth, fifth and sixth mirrors, and wherein the

extreme ultraviolet light from the reticle is directed by these six mirrors to a substrate to be exposed.

5   20.   A device manufacturing method, comprising the steps of:
          exposing a substrate with a device pattern by use of an exposure apparatus as recited in Claim 18; and
10   developing the exposed substrate.